PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
P16894WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE 2004/000809	24.05.2004	23.05.2003
International Patent Classification (IPC) or national classification and IPC		
H04Q 7/36		
Applicant		
TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
18.03.2005	25.05.2005
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2004/000809

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☒ the international application as originally filed/furnished

☒ the description:

pages 1-5 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 6-7 received by this Authority on 09.05.2005
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-3 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2004/000809

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims		NO
Inventive step (IS)	Claims	1-10	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention

The present invention relates to a method and a tool for cell planning in a mobile communication system. The system registers the position, bite rate and path loss of mobile stations. The registered measurements are used to determine an optimal site in the mobile communication system.

Reference is made to the following documents:
D1: US5561839 A
D2: S. Irons et al, "Supporting the successful deployment of third generation public cellular technologies-system dimensioning and network planning", First International Conference on 3G Mobile Communication Technologies, 2000, London , UK, 03/27/2000 - 03/29/2000, pages 156-160

Reasoned statement

D1 describes a method for cell planning. Mobile stations measure the signal strength, (figure 1, column 4 lines 16-33). The measurements are stored, (column 4 lines 33-49).

D2 describes a method of dimensioning cells such that the load in the cell is below the maximum permissible system load, (figure 1). The bite rate of the user is included when computingcomputing the load, (157-158).

The invention defined in claims 1, 6 and 10 differs from D1 and D2 in that the density of traffic is estimated by registering the position and the bite rate for the mobile

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

user.

The subject-matter of claims 1, 6 and 10 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may therefore be regarded as that the subscribers' position should be considered when planning new cells.

None of the cited documents suggests a solution to the above problem, i.e. registering the position. Consequently, the invention involves an inventive step (Article 33(3) PCT)

Claims 2-5 and 7-9 also meet the requirements of the PCT with respect to novelty and inventive step.

The invention is industrially applicable.

PCT / SE 2004 / 000809
09 -05- 2005

Claims

1. A method in a cellular mobile telecommunication system for cell planning and preparing for a cell split when a cell tends to get congested or overloaded ***characterised in*** that position related data comprising the locations (x, y) for mobile users (MS) is registered together with what service is used by each user in terms of bit rate and wherein an estimation of the traffic density within the cell is created.

2. The method of claim 1, wherein the path losses experienced on the radio channels (CH) of the mobiles (MS) are registered.

3. The method of claim 1 or 2, wherein an optimal site for a new base station is established based on the registered data.

4. The method of claim 3 wherein maximising the following function gives the optimal site (x_{opt}, y_{opt}) for the new base station

   $$x_{opt}, y_{opt} = max\, f(BR_n/PL_n, x_n, y_n)\ for\ all\ n$$

   where n an index number for the mobile users of the cell, BR_n is the bit rate used, PL_n is the path loss and x_n, y_n is the location of the user n.

5. The method of claim 4, wherein a map is created showing the site of the new base station.

6. A cell planning tool preparing for a cell split in a cellular telecommunication system comprising a control network (RNC/BSC) for registering the location (x, y) of mobile stations (MS) using the system ***characterised in*** that means are included for registering the services used by the mobile stations and of further means for, based on the positioning and service data, estimating the traffic density of the cell.

7. The cell planning tool of claim 6, wherein the tool further comprises means for registering the path losses of the radio channels (CH) allocated to the mobile users.

8. The cell planning tool of claim 6 or 7 wherein an optimal place (x_{opt}, y_{opt}) for a new site is established in a cell planning system node (CPS) of the tool.

9. The cell planning tool of claim 8, wherein the system node (CPS) establishes the optimal place (x_{opt}, y_{opt}) based on the maximum of the following expression

$$x_{opt}, y_{opt} = max\, f(BR_n/PL_n, x_n, y_n)\ for\ all\ n$$

where n an index number for the mobile users of the cell, BR is the bit rate used, PL is the path loss and x, y is the location of a user.

10. A cellular telecommunication system comprising base stations (BS) and mobile stations (MS) in communication with each other in a cell under supervision of a control network (RNC/BSC) ***characterised by*** a cell planning system node (CPS) which collects data from the telecommunication system relating to the location (x, y) of the mobile stations (MS), their path losses on their radio channels and the services they use, and wherein said node (CPS) comprises data collecting and calculation equipment, which predicts an optimal place (x_{opt}, y_{opt}) for a new base station when the cell otherwise will be overloaded.